

DOCUMENT RESUME

ED 252 180

IR 011 439

AUTHOR Ashmore, Timothy M.
TITLE Evaluating CAI Material for the Microcomputer.
PUB DATE Nov 84
NOTE 14p.; Paper presented at the Annual Meeting of the Speech Communication Association (Chicago, IL, November 1984). Appendix A contains marginally legible print.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150) -- Tests/Evaluation Instruments (160)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Courseware; *Evaluation Criteria; *Evaluation Methods; Material Development; Media Selection; *Worksheets
IDENTIFIERS *Software Evaluation

ABSTRACT

The relative worth of any evaluation instrument depends on user needs and the material being evaluated. Potential users of a good computer assisted instruction (CAI) instrument include purchasers, authors, reviewers, and publishers of CAI materials. Although each user has unique needs, a good instrument will serve both to educate and discriminate, and typically addresses the biographical/bibliographical data, content data, documentation, and special characteristics of the program. This study evaluated nine published evaluation forms according to criteria that related to whether and how the forms addressed supplier data, cost, name/subject, grade level, computer type, memory requirements, program type, program accuracy, teaching aids, attention/interest, clarity of purpose, field testing, course/grade, prerequisite skills, related materials, clarity of directions, recordkeeping, graphics/animation/sound, time required, lesson difficulty, writing quality, and number of students who can use the instrument at the same time. Based on the results, an instrument was developed that combined and slightly altered the courseware evaluation instrument of the Northwest Regional Educational Laboratory and the Software Evaluation Checklist of the National Council of Teachers of Mathematics. The evaluation results, the new form, and a nine-item bibliography are included in this report. (LMM)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED252180

EVALUATING CAI MATERIAL
FOR THE
MICROCOMPUTER

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as
received from the person or organization
originating it.
Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

by

Timothy M. Ashmore
Department of Communicative Arts & Sciences
Eastern New Mexico University
Portales, NM 88130

Paper presented for the SCA Task Force on Computer Applications: Report to
the Membership at the Speech Communication Association meeting in Chicago,
Illinois on November, 1984.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY
Timothy M. Ashmore

IR011439

EVALUATING CAI MATERIAL
FOR THE
MICROCOMPUTER

The relative worth of any evaluation instrument is always a product of the needs of the user and the material being evaluated. As obvious as the statement may appear the generation of a quality instrument is complicated when there are a variety of potential users with differing needs who wish to apply the instrument to a wide variety of materials. This is precisely the case facing the author of an instrument with which to evaluate Computer Assisted Instructional material.

This paper will describe the potential users of such an instrument, the functions of the instrument, and the content of the instrument. The paper will then review a number of published evaluation forms and conclude with a presentation of a new form which reflects the strengths of the reviewed forms.

The potential users of a 'good' evaluation instrument include purchasers, authors, reviewers, and publishers of CAI materials. Each class of user has their unique set of needs that must be met by the evaluation instrument. However, a 'good' instrument will serve two general functions for all users. The general functions are education and discrimination.

Specifically, the evaluation instrument should educate the purchaser of CAI materials as to the variables that are important in the evaluative process. The aspiring author of CAI software and the accomplished programmer alike should learn from the instrument what characteristics are valued in CAI materials. The reviewer of CAI software should also be able to benefit from an evaluation instrument that requires a thorough examination of a wide variety of potentially

significant variables. In the same light, a Communication Editor or Field Representative should be able to utilize an evaluative instrument to ascertain the nature and quality of potential CAI materials.

The evaluation instrument serves a discriminative function when it allows the purchaser of CAI materials to critically evaluate or compare any number of similar pieces of software. Such a comparison or evaluation should save the purchaser a substantial amount of time and money. The instrument also serves a discriminative function for the CAI author when the instrument is used as the basis for developing and field testing the author's product. Therefore, the author is better able to objectively ascertain the relative educational value of her/his program by checking the program against a predetermined set of criteria contained in the evaluation instrument.

Assuming the above user needs and instrument functions are correct it is then appropriate to discuss the content of a 'good' evaluation instrument. The content typically addresses such issues as the biographical/bibliographic data, content data, documentation, and special characteristics of the program. The biographical/bibliographical data contains such information as:

1. The name, address, and telephone number of the supplier.
2. The cost of the CAI package.
3. The program name and subject addressed in the material.
4. The appropriate grade level of the material.
5. The brand(s) and model(s) of computer needed to run the program.
6. The special memory, screen, and printer requirements necessary.
7. The program type or format (ie. simulation, game, or drill and practice).

The content data normally addresses such concerns as:

1. The accuracy and recency of the content.
2. The program's ability to serve as a teaching aid.
3. The program's ability to motivate and hold the attention and interest

of the intended student.

The program documentation requirements normally address such issues as:

1. The clarity of the program's purpose, intent, and topics.
2. Has the program been adequately validated/tested in the classroom for which it was intended.
3. The name of the subject matter and grade level(s) for which the program was intended.
4. The prerequisite skills and knowledge necessary to meaningfully utilize the program.
5. The related textual and media materials available to augment the program.
6. The clarity of the directions for the use of the program. This applies to both the printed manual and the directions as they appear on the screen.

The category of special characteristics addresses such issues as:

1. The capacity for and nature of record keeping.
2. The program's use of graphics, animation, and sound.
3. The amount of time required for the student to complete each lesson.
4. The overall difficulty of the lesson.
5. The general quality and style of writing including grammar, spelling, and carefulness of editing of the manual and the screen directions.
6. The number of students who may use the program at one time (ie. one vs. the computer, pairs, or class demonstration).
7. The reviewer's final recommendation regarding the use, purchase, further development or refinement of the program.

The table which follows is the result of applying the criteria listed above to a number of published evaluation forms. The forms included here are the Review Rating Form developed for Ccnduit (1981); the Software Evaluation Checklist

developed by the National Council of Teachers of Mathematics (1981); the Microcomputer Instructional Software Evaluation Form developed by the Pennsylvania State Department of Education (ED 205 201); the Courseware Evaluation Form developed by the Northwest Regional Educational Laboratory (1981); the CAI Courseware Review Checklist developed by Robert L. Burke in CAI: Sourcebook (1982); the Microcomputer Courseware Evaluation Form by the EPIE Institute (1982); the School Microware Evaluation Form developed by Dresden Associates (1982); the Microcomputer Educational Materials Evaluation Form developed by the Minnesota Educational Computing Consortium (1982); and the Scholastic Software Evaluation form developed by Poirot and Billings (1982).

Insert Table 1 about here

Examining each of the four major category headings appears to be the most productive means of analyzing the data in Table #1. The first seven columns focus on the biographical/bibliographical category. The forms distributed by the National Council of Teachers of Mathematics (NCTM), Burke (1982), and the Educational Products Information Exchange (EPIE) acknowledge the existence of all seven potential issues and allow for some form of evaluation of each issue. Poirot and Billings (1982) omits only the issue of cost.

The next three columns address program content. Six of the instruments deal with all three issues. Burke (1982) fails to address any of the issues while the Pennsylvania State document and the NCTM document fail to address one and two of the issues respectively.

The next six columns address issues of program documentation. Four instruments receive perfect scores in this area. The instruments are NCTM, EPIE, Dresden (1982), and the Minnesota Educational Computing Consortium (MECC). The

TABLE I

CONTENT OF EVALUATION INSTRUMENTS

INSTRUMENT SOURCE																								
CONDUIT		Y	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	Y	N	Y
NCTM		Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N
PENN STATE		Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	N	N	Y	N	N	Y
NWREL		Y	N	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	N	Y
BURKE		Y	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y	N	N	Y	Y	Y	Y	N	Y	N	N
EPIE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
DRESDEN		Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	N
MECC		N	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	Y
PIOROT BILLINGS		Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y
		SUPPLIER DATA	COST	NAME/ SUBJECT	GRADE/ LEVEL	COMPUTER TYPE	MEMORY, ETC. REQUIREMENTS	PROGRAM TYPE	PROGRAM ACCURACY	TEACHING AID	ATTENTION/ INTEREST	CLARITY OF PURPOSE, ETC.	FIELD TESTING	COURSE/ GRADE	PREREQUISITE SKILLS	RELATED MATERIALS	CLARITY OF DIRECTIONS	RECORD KEEPING	GRAPHICS/ ANIMATION/ SOUND	TIME REQUIRED	LESSON DIFFICULTY	WRITING QUALITY	# OF STUDENTS TO USE	FINAL RECOMMENDATIONS

Conduit and Northwest Regional Educational Laboratory (NWREL) instruments miss on only one of the six issues.

The last seven columns address issues related to special characteristics. The Poirot and Billings (1982) and the EPIE instruments both omit two issues in this category. The remaining instruments reflect a mixture of omissions culminating with Conduit's high of five omissions out of seven issues.

The EPIE instrument fares best when the content of each instrument is viewed separately. EPIE misses only two issues out of a total of twenty-three. The instruments from NCTM, Poirot and Billings (1982), and Dresden (1982) are next with five, six, and seven omissions respectively. On the surface the EPIE instrument appears to be the best instrument available. However, the instrument is twelve pages long. Therefore, what the instrument may gain in completeness it may lose in its length. The instrument is not user friendly.

The following evaluation instrument is based on the results listed above. The biographical/bibliographical data will be obtained from page #1 of the NCTM (1981) instrument. The combining of the two instruments addresses all the issues in the documentation area. When the two instruments are combined the issues of record keeping, lesson difficulty, and # of students to use remain unaddressed in the special characteristics area. Therefore, the NCTM instrument was altered to accommodate the three missing issues. No questions were removed or altered in the original NCTM instrument. See Appendix A for the combined and revised CAI evaluation instrument.

It is contended here that the world does not have to rediscover the wheel at every turn. The same philosophy holds true for evaluation instruments. When the NWREL and NCTM are combined and slightly altered the result is a compact and useful evaluation instrument. When used correctly by CAI purchasers, authors, reviewers, or publishers, the instrument should serve both an educational and discriminative function. The instrument should educate each audience

of what is important in CAI software and allow each audience to determine how each individual program stacks up against the criteria. Such a comparison should result in more informed and more critical decisions in the area of CAI software.



SAMPLE SOFTWARE DOCUMENTATION SHEET

PROGRAM NAME: _____

SUBJECT AREA: _____

PROGRAM CLASS

- _____ isolated program
 _____ part of a _____ program cluster

INTENDED AUDIENCE(S)

- _____ teachers
 _____ students in grade(s) _____
 _____ other _____

PROGRAM USES: (1 = primary, 2 = secondary)

- _____ drill or practice
 _____ tutorial
 _____ simulation
 _____ instructional gaming
 _____ problem solving
 _____ informational
 _____ other _____

CRITICAL PREREQUISITE SKILLS

NAME(S) OF PREREQUISITE PROGRAM(S)

NAME(S) OF FOLLOW-UP PROGRAM(S)

DATE OF THIS DOCUMENTATION

PROGRAM SOURCE

name: _____

address: _____

phone: _____

program cost: _____

SYSTEM REQUIREMENTS

computer: _____

language: _____

memory needed: _____ bytes

input mode: cassette

_____ -inch diskette

cartridge

other _____

OUTPUT MODE:

COLOR -- ~~B/W~~ -- ~~MONITOR~~PRINTER -- ~~PLOTTER~~ --

OTHER -----

CLASSROOM VALIDATION (describe) :

AVERAGE EXECUTION TIME -- ~~MINUTES~~

STUDENT GROUPINGS: ----- INDIVIDUAL

----- PAIRS

----- SMALL GROUPS

----- CLASSROOM

RECORD KEEPING: ----- YES ----- NO

LESSON DIFFICULTY:

----- HIGH ----- RIGHT ----- LOW

RATING:		IMPORTANCE:							
Strongly Agree	Agree	Disagree	Strongly Disagree						
SA	A	D	SD						
Not Applicable									
NA									
Higher									
Lower									
 Northwest Regional Educational Laboratory Copyright 1981 NWREL									
RATING: Circle the letter abbreviation which best reflects your judgment (use the space following each item for comments). IMPORTANCE: Circle the letter which reflects your judgment of the relative importance of the item in this evaluation. ☐ Check this box if this evaluation is based partly on your observation of student use of this package.		Evaluator's Guide Page Reference →							
CONTENT	SA	A	D	SD	NA	H	L	1. The content is accurate.	18
	SA	A	D	SD	NA	H	L	2. The content has educational value.	19
INSTRUCTIONAL QUALITY	SA	A	D	SD	NA	H	L	3. The content is free of race, ethnic, sex, and other stereotypes.	20
	SA	A	D	SD	NA	H	L	4. The purpose of the package is well-defined.	21
	SA	A	D	SD	NA	H	L	5. The package achieves its defined purpose.	22
	SA	A	D	SD	NA	H	L	6. Presentation of content is clear and logical.	23
	SA	A	D	SD	NA	H	L	7. The level of difficulty is appropriate for the target audience.	24
	SA	A	D	SD	NA	H	L	8. Graphics/color/sound are used for appropriate instructional reasons.	26
	SA	A	D	SD	NA	H	L	9. Use of the package is motivational.	27
	SA	A	D	SD	NA	H	L	10. The package effectively stimulates student creativity.	28
	SA	A	D	SD	NA	H	L	11. Feedback on student responses is effectively employed.	29
	SA	A	D	SD	NA	H	L	12. The learner controls the rate and sequence of presentation and review.	30
	SA	A	D	SD	NA	H	L	13. Instruction is integrated with previous student experience.	31
	SA	A	D	SD	NA	H	L	14. Learning is generalizable to an appropriate range of situations.	32
	TECHNICAL QUALITY	SA	A	D	SD	NA	H	L	15. The user support materials are comprehensive.
SA		A	D	SD	NA	H	L	16. The user support materials are effective.	34
SA		A	D	SD	NA	H	L	17. Information displays are effective.	35
SA		A	D	SD	NA	H	L	18. Intended users can easily and independently operate the program.	36
SA		A	D	SD	NA	H	L	19. Teachers can easily employ the package.	37
SA		A	D	SD	NA	H	L	20. The program appropriately uses relevant computer capabilities.	38
SA		A	D	SD	NA	H	L	21. The program is reliable in normal use.	39
Permission to copy this form for courseware evaluation purposes is hereby granted.		CHECK ONLY ONE ☐ I would use or recommend use of this package with little or no change. (Note suggestions for effective use on the front page.) ☐ I would use or recommend use of this package only if certain changes were made. (Note changes under major weaknesses on the next page.) ☐ I would not use or recommend this package. (Note reasons under major weaknesses.)							

BIBLIOGRAPHY

- Burke, R.L. CAI SOURCEBOOK, Englewood Cliffs, N.J.: Prentice Hall, Inc., 1982.
- Douglas, S. and Neights, G. Microcomputer Instructional Software Evaluation Form. Instructional Software Selection: A Guide to Instructional Micro-computer Software. Harrisburg, PA: Pennsylvania State Department of Education, (ED 205 201).
- Dresden Associates. School Microware Evaluation Form. Dresden, ME., 1982.
- EPIE Institute. Microcomputer Courseware Evaluation Form. Stony Brook, N.Y.: EPIE & Consumers Union, 1982.
- MECC. Microcomputer Educational Materials Evaluation. St. Paul, MN: Minnesota Educational Computing Consortium, 1982.
- MicroSIFT. Courseware Evaluation. Portland, OR: NWREL, 1981.
- National Council of Teachers of Mathematics. Sample Software Documentation Sheet. Guidelines for Evaluating Computerized Instructional Materials. NCTM, 1981.
- Peters, H.J. Author's Guide: Design Development Style Packaging Review. Iowa City: Conduit, 1981.
- Poirot, J. and Billings, K. Scholastic Software Evaluation Form. Microcomputers in Education: A Scholastic In-Service Training Program. Scholastic Book Services, 1982.